

## CLAIMS

What is claimed is:

1. A method for interactive debugging comprising:  
2 selecting a target construct for debugging;  
3 accessing data related to an operation of the target construct by a debug  
4 construct; and  
5 monitoring at least a portion of the data without disturbing the operation of the  
6 target construct to debug the target construct.

2. The method of claim 1 further comprising modifying at least a portion of the  
data.

3. The method of claim 1 wherein the target construct is one selected from the  
group consisting of a service, a socket, a service stack, a set of services, and a set of  
sockets.

4. The method of claim 1 wherein the debug construct comprises at least one  
service, at least one socket, or a combination of at least one service and at least one  
socket.

5. The method of claim 1 wherein selecting a target construct further comprises:  
providing information about a plurality of services; and

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selecting the target construct from the plurality of services.

1 6. The method of claim 5 wherein the information includes a current state of each of  
2 the plurality of services.

1 7. The method of claim 5 further comprising:  
2 providing information about a plurality of sockets; and  
3 selecting the target construct from the plurality of sockets.

1 8. The method of claim 7 wherein the information includes a current state of each of  
2 the plurality of services.

1 9. The method of claim 1 further comprising accessing a memory of the target  
2 construct by the debug construct, the accessing corresponding to reading the memory  
3 or writing to the memory.

1 10. The method of claim 1 further comprising accessing state of the target construct  
2 by the debug construct, the accessing corresponding to reading the state or modifying  
3 the state.

1 11. The method of claim 1 further comprising dynamically allocating the debug  
2 construct.

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1 12. The method of claim 1 further comprising dynamically de-allocating the debug  
2 construct once the monitoring is completed.

1 13. The method of claim 1 further comprising collecting statistics related to the target  
2 construct.

1 14. The method of claim 1 further comprising transmitting the data to at least one  
2 host system.

1 15. The method of claim 14 wherein the data is transmitted based upon a request  
2 sent by a host application.

1 16. The method of claim 14 wherein an operating system determines which data is to  
2 be transmitted.

1 17. The method of claim 14 wherein the debug construct specifies which data is to be  
2 transmitted.

1 18. The method of claim 1 further comprising notifying the debug construct upon a  
2 completion of a certain operation by the target construct.

1 19. The method of claim 14 further comprising:

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measuring bandwidth required to transmit the data; and  
transmitting at least a portion of data based upon available bandwidth.

20. The method of claim 1 wherein debugging is performed in a multi-channel,  
multi-service environment.

21. The method of claim 15 wherein sending the request and transmitting the  
response are performed over a network.

22. The method of claim 1 further comprising:  
collecting at least a portion of the data;  
allocating a copy of the target construct in a simulated environment; and  
debugging the operation of the target construct using the collected data in the  
simulated environment.

23. The method of claim 1 further comprising:  
generating a request by a host application;  
transmitting the request to an operating system;  
performing the request by the operating system; and  
sending a response to the host application.

24. A method for multi-channel, multi-service debugging, comprising:

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providing information about at least one service;

3 maintaining an isolated debugging environment for each of the at least one

4 service; and

5 selecting a target construct for debugging from the at least one service.

1 25. The method of claim 24 wherein the information about the at least one service

2 includes a current state of each service.

1 26. The method of claim 24 further comprising:

2 providing information about at least one socket;

3 maintaining an isolated debugging environment for each of the at least one

4 socket; and

5 selecting a target construct for debugging from the at least one socket.

1 27. The method of claim 26 wherein the information about the at least one socket

2 includes a current state of each socket.

1 28. The method of claim 24 wherein the target construct is one selected from the

2 group consisting of a service, a socket, a service stack, a set of services, and a set of

3 sockets.

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1 29. The method of claim 28 further comprising switching between services and  
2 sockets during a debugging process.

1 30. The method of claim 24 wherein the isolated debugging environment is  
2 maintained by an operating system in cooperation with a host application.

1 31. The method of claim 24 wherein the target construct is selected based upon a  
2 request from a host application.

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1 32. The method of claim 24 further comprising:  
2 generating a request by a host application;  
3 transmitting the request to an operating system;  
4 performing the request by the operating system; and  
5 sending a response to the host application.

1 33. The method of claim 32 wherein transmitting the request and sending a response  
2 are performed over a network.

1 34. The method of claim 24 further comprising:  
1 sending a request by a host application; and  
2 receiving a response by the host application once a requested operation is  
3 completed.

1 35. The method of claim 34 wherein sending a request and receiving a response are  
2 performed over a network.

1 36. The method of claim 24 further comprising:  
1 receiving a request by an operating system;  
2 performing a requested operation; and  
3 transmitting a response once the requested operation is completed.

1 37. The method of claim 36 wherein receiving a request and transmitting a response  
2 are performed over a network.

1 38. The method of claim 24 further comprising dynamically allocating at least one  
2 service into the target construct.

1 39. The method of claim 38 further comprising instantiating any of at least one  
2 service, at least one service stack, and at least one socket.

1 40. The method of claim 24 further comprising substituting input and output data  
2 for at least one socket.

1 41. The method of claim 40 further comprising:  
2 collecting data for at least one socket;

3 allocating a copy of the target construct in a simulated environment; and  
4 debugging the operation of the target construct using the collected data.

1 42. An apparatus for interactive debugging comprising:  
2 means for selecting a target construct for debugging;  
3 means for accessing data related to an operation of the target construct by a  
4 debug construct; and  
5 means for monitoring at least a portion of the data without disturbing the  
6 operation of the target construct.

1 43. An apparatus for multi-channel, multi-service debugging, comprising:  
2 means for providing information about at least one services;  
3 means for maintaining an isolated debugging environment for each of the at least  
4 one service; and  
5 means for selecting a target construct for debugging from the at least one service.

1 44. An apparatus for interactive debugging comprising:  
2 a target construct; and  
3 a debug construct configured to access data related to an operation of the target  
4 construct in real time and to monitor at least a portion of the data without disturbing  
5 the operation of the target construct.



1 45. The apparatus of claim 44 wherein the debug construct is further configured to  
2 modify at least a portion of the data.

1 46. The apparatus of claim 44 wherein the target construct is one selected from the  
2 group consisting of a service, a socket, a service stack, a set of services, and a set of  
3 sockets.

1 47. The apparatus of claim 44 wherein the debug construct comprises at least one  
2 service, at least one socket, or a combination of at least one service and at least one  
3 socket.

1 48. The apparatus of claim 44 further comprising a user interface for providing  
2 information about a plurality of services and selecting the target construct from the  
3 plurality of services upon a user request.

1 49. The apparatus of claim of claim 48 wherein the information about a plurality  
1 of services includes a current state of each of the plurality of services.

1 50. The apparatus of claim 48 wherein the user interface further provides  
2 information about a plurality of sockets and allows the user to select the target construct  
3 from the plurality of sockets.

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1 51. The apparatus of claim 50 wherein the information about a plurality  
1 of sockets includes a current state of each of the plurality of sockets.

1 52. The apparatus of claim 48 wherein the user interface is a text-based interface or  
2 graphical user interface.

1 53. The apparatus of claim 44 further comprising a platform control socket  
2 configured to dynamically allocate the debug construct.

1 54. The apparatus of claim 44 further comprising a platform control socket further  
2 configured to dynamically de-allocate the debug construct once the monitoring is  
3 completed.

1 55. The apparatus of claim 44 further comprising a profiler collecting statistics  
2 related to the target construct.

1 56. The apparatus of claim 44 further comprising:  
2 at least one host processor; and  
3 a communications infrastructure for transmitting the data to the host processor.

1 57. The apparatus of claim 56 further comprising an operating system configured to  
2 determine which data is to be transmitted, measure bandwidth required to transmit the

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4 bandwidth.

1 58. The apparatus of claim 56 wherein the debug construct is further configured to  
2 specify which portion of the data is to be transmitted.

1 59. The apparatus of claim 56 wherein the data is transmitted based upon the  
2 request sent by a host application.

003048.P010 1 60. The apparatus of claim 44 wherein debugging is performed in a multi-channel,  
2 multi-service environment.

003048.P010 1 61. The apparatus of claim 56 further comprising:  
2 a host application generating a request;  
3 a communications infrastructure transmitting the request to the debug construct;  
4 and  
5 the debug construct configured to perform the request and to send a response to  
6 the host application.

1 62. The apparatus of claim 61 wherein the communications infrastructure is a  
2 network.

1 63. The apparatus of claim 56 further comprising a host application sending a  
2 request and receiving a response once a requested operation is completed.

1 64. The apparatus of claim 63 wherein the host application sends a request and  
2 receives a response over a network.

1 65. The apparatus of claim 56 wherein the debug construct is further configured to  
2 receive a request, perform a requested operation, and transmit a response once the  
3 requested operation is completed.

1 66. The apparatus of claim 65 wherein the debug construct receives the request and  
2 transmits the response over a network.

1 67. An apparatus for multi-channel, multi-service debugging, comprising:  
2 a graphical user interface for providing information about at least one service;  
3 an operating system maintaining an isolated debugging environment for each of  
4 the at least service; and  
5 a debug core configured to select a target construct for debugging from the at  
6 least one service upon a user request.

1 68. The apparatus of claim 67 wherein the information about the at least one service  
2 includes a current state of each service.

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1 69. The apparatus of claim 67 wherein the graphical user interface provides  
2 information about at least one socket, the operating system maintains an isolated  
3 debugging environment for each of the at least socket, and the debug core is configured  
4 to select a target construct for debugging from the at least one socket upon a user  
5 request.

1 70. The apparatus of claim 69 wherein the information about the at least one socket  
2 includes a current state of each socket.

1 71. The apparatus of claim 67 wherein the target construct is one selected from the  
2 group consisting of a service, a socket, a service stack, a set of services, and a set of  
3 sockets.

1 72. The apparatus of claim 67 wherein the debug core is further configured to switch  
2 between services and sockets during a debugging process upon a user request.

1 73. The apparatus of claim 67 further comprising a host application configured to  
2 send a request to select the target construct.

1 74. The apparatus of claim 73 further comprising:  
2 a communications infrastructure transmitting the request to an operating system;  
3 and

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the operating system configured to perform the request.

1 75. The apparatus of claim 74 wherein the communications infrastructure is a  
2 network.

1 76. The apparatus of claim 67 further comprising a host application sending a  
2 request for a debugging operation and receiving a response once the operation is  
3 completed.

1 77. The apparatus of claim 67 wherein the operating system receives a request for a  
2 debugging operation, performs the operation, and transmits a response once the  
3 requested operation is completed.

1 78. The apparatus of claim 67 further comprising a host application requesting to  
2 dynamically allocate at least one service into the target construct and to instantiate at  
3 least one service or at least one service stack.

1 79. The apparatus of claim 67 wherein a host application cooperates with the  
2 operating system to substitute input and output data for at least one socket.

1 80. The apparatus of claim 79 wherein the host application is configured to request  
2 to collect data for at least one socket, to allocate a copy of the target construct in a

3 simulated environment, and to debug the operation of the target construct using the  
4 collected data in the simulated environment.

1 81. A system for interactive debugging, comprising:  
2 a memory configured to store data related to an operation of a target construct;  
3 and  
4 at least one processor coupled to the memory, the processor configured to select  
5 the target construct for debugging, access the data in the memory in real time, and  
6 monitor at least a portion of the data from the memory without disturbing the operation  
7 of the target construct to debug the target construct.

1 82. A system for multi-channel, multi-service debugging, comprising:  
2 a memory configured to store information at least one service; and  
3 at least one processor coupled to the memory, the processor configured to  
4 maintain an isolated debugging environment for each of the at least one service and to  
5 provide a capability to view the information stored on the memory and to select a target  
6 construct for debugging from the information.

1 83. A computer readable medium comprising instructions, which when executed on  
2 a processor, perform a method for interactive debugging comprising:  
3 selecting a target construct for debugging;

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5 construct in real time; and

6 monitoring at least a portion of the data without disturbing the operation of the

7 target construct to debug the target construct.

1 84. A computer readable medium comprising instructions, which when executed on  
2 a processor, perform a method for multi-channel, multi-service debugging, comprising:

3 providing information about at least one service;

4 maintaining an isolated debugging environment for each of the at least one  
5 service; and

6 selecting a target construct for debugging from a plurality of running services.